

Notice of Allowability

Application No.

10/649,676

Examiner

Wesley D Markham

Applicant(s)

CHEN ET AL.

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to applicant's amendment filed on 9/7/2004.
2. ☒ The allowed claim(s) is/are 1-11.
3. ☒ The drawings filed on 28 August 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

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EXAMINER'S AMENDMENT / ALLOWANCE

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Richard Fichter on 10/29/2004.

The application has been amended as follows:

In the claims:

In Claim 6, line 4, the phrase, "cycohexyl methacrylate" has been replaced with the phrase, --cyclohexyl methacrylate--.

In Claim 6, line 4, the word, "brnyl" has been replaced with the word, --bornyl--.

Allowable Subject Matter

The formal drawings (6 sheets, 6 figures) filed by the applicant on 8/28/2003 are acknowledged and approved by the examiner. The substitute declaration filed by the applicant on 9/7/2004 is approved by the examiner. The objections to the specification, including the abstract of the disclosure, set forth in paragraphs 4 – 5 of the previous

Office Action (i.e., the *Ex parte Quayle* action mailed on 7/12/2004), are withdrawn in light of the applicant's amendments to correct various informalities. The objections to Claims 1 and 10, set forth in paragraph 6 of the previous Office Action, are withdrawn in light of the applicant's amendments to correct various typographical errors.

Claims 1 – 11 are allowed. The following is an examiner's statement of reasons for allowance: The claimed process, as represented by independent Claim 1 (from which Claims 2 – 11 depend), is drawn to preparing an optical waveguide from an acrylate / titanium alkoxide composite material. The process comprises forming a specific precursor solution by reacting an acrylate with titanium alkoxide in the presence of a silicon coupling agent and water by an acid-free sol-gel method, coating such solution on a silicon dioxide-coated silicon chip and evaporating the solvent at a specific temperature to form a composite film, using lithography to form a channel on the resulting film, repeating the step of forming the precursor solution while using a different ratio of acrylate and titanium alkoxide in order to form a solution having a refractive index less than that of the solution obtained from the step above, and applying the lower refractive index solution onto the film having the channel(s), evaporating the solvent, and then baking to produce the acrylate / titanium alkoxide composite optical waveguide component.

The closest prior art of record is discussed below. Dawes et al. (USPN 6,144,795) teaches a process of forming a hybrid organic-inorganic optical waveguide device but does not teach or reasonably suggest using the applicant's claimed precursor solution (e.g., the material of Dawes et al. lacks an acrylate component) or

using lithography to form a channel in the deposited film. Kuramoto et al. (US 2003/0228120 A1) teaches a process of forming a hybrid organic-inorganic optical waveguide but does not teach or reasonably suggest using the applicant's claimed precursor solution (e.g., the material of Kuramoto et al. lacks a silicon coupling agent) or process (e.g., using lithography to form a channel on the resulting film, and repeating the step of forming the precursor solution while using a different ratio of acrylate and titanium alkoxide in order to form a solution having a refractive index less than that of the solution obtained from the first step, and applying the lower refractive index solution onto the film having the channel(s)). Etienne (US 2004/0071426 A1) teaches forming a hybrid organic-inorganic waveguide but lacks a teaching of the claimed precursor composition (e.g., a titanium alkoxide) or method (e.g., forming a channel using lithography, repeating the deposition with a precursor solution that has a different ratio of acrylate and titanium alkoxide, etc.). The organic / inorganic hybrid composition taught by Su et al. (USPN 6,492,540 B1) does not contain a silicon coupling agent, and there is no teaching or suggestion in Su et al. to perform the applicant's claimed process steps. The metal alkoxide polymers taught by Zha (US 2003/0195321 A1) are formed by acidolysis (i.e., not an acid-free sol-gel method), and Zha does not teach the claimed process steps (e.g., repeating the deposition with a precursor solution that has a different ratio of acrylate and titanium alkoxide). The organic-inorganic composite material of Kuramoto et al.(2) (US 2003/0165710 A1) is different from the applicant's claimed precursor solution and is not formed by an acid-free sol-gel method. Further, Kuramoto et al.(2) does not teach or reasonably suggest forming a channel using

lithography in the context of the applicant's claims. Rantala (US 2004/0008960 A1) teaches forming an organic-inorganic hybrid material optical waveguide by depositing the hybrid material onto a substrate, patterning the deposited material (i.e., forming channels) to form a core, and then depositing a hybrid material having a different ratio of components over the previously patterned film to form a cladding. However, the precursor material taught by Rantala is significantly different from the applicant's claimed precursor solution (i.e., a solution prepared by reacting an acrylate with titanium alkoxide in the presence of a silicon coupling agent and water by an acid-free sol-gel method), and there is no teaching or suggestion in the prior art to use a precursor solution prepared in the manner claimed by the applicant in the process of Rantala. The photo-patternable perfluorinated silane sol-gel material taught by Fardad et al. (US 2004/0033309 A1) is different from the applicant's claimed precursor solution, and the process of Fardad et al. does not include repeating the deposition with a precursor solution that has a different ratio of components such as acrylate and titanium alkoxide. The composition used to produce the waveguide tunable laser of Reisfeld et al. (USPN 5,783,319) does not contain a silicon coupling agent and is not prepared by an acid-free sol-gel method. Additionally, the process used by Reisfeld et al. to produce the waveguide tunable laser is significantly different from the applicant's claimed process (e.g., there are no channel forming or repeating steps in the process of Reisfeld et al.). As such, the prior art of record, alone or in combination, does not teach or reasonably suggest each and every limitation of independent Claim 1, and this claim is allowed. Since Claims 2 – 11 depend from Claim 1, these claims are also allowed.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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